# AVIATION

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VOLUME XVI

NUMBER 21

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ADMIRAL MOFFETT CLAIMS FOR NAVY ALL SEA FLYING

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HIGHLAND, N. Y.
225 FOURTH AVENUE, NEW YORK

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# AVIATION

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*Published every Monday*

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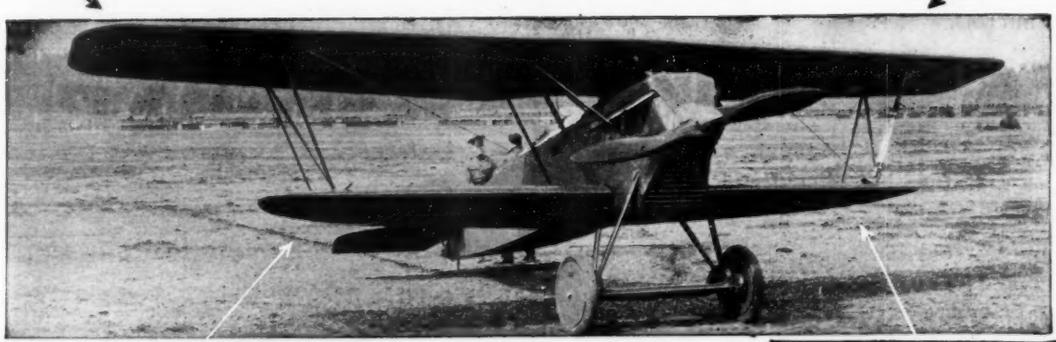

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# AVIATION

LADISLAS D'ORCY
EDITOR

VIRGINIUS E. CLARK
EDWARD P. WARNER
RALPH H. UPSON
CONTRIBUTING EDITORS

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## Air Regulations and the Commercial Pilot

IT is often said that we have no Aviation laws because the public and Congress are apathetic to the subject. This is only part of the truth, many bills of less importance are passed and it does not take a wizard to see that there is real opposition to any regulation of aviation. Unfortunately much of this opposition does not come from arm chair aviators but from the men who are carrying on the only actual commercial flying which exists in this country, that is the "Gypsy Flier" or "Barn Stormer," the exhibition and stunt flier and the man who owns a small field or who trades in airplane parts.

The opposition apparently is partly a matter of psychology but mostly a fear that the pocket will be affected. The independent flier says that the cost of obtaining a license and of having his machine inspected periodically would be very considerable and they claim that an arbitrary board of technical experts would refuse licenses to planes which are really fit to fly. The exhibition flier feels that he would be seriously hampered if not entirely put out of business by legislation. The man who has invested his own money in a flying field feels that it is unfair for the government to maintain large flying fields which would compete with his own. The jobber who is selling war surplus material feels that his operations might be hampered by too strict an inspection. When the pocket nerve is threatened even the hardiest aviator gets squeamish.

Aside from the money feature there is the mental attitude of the barn storming pilot. He is essentially independent, fights his own battles and any form of regulation is entirely foreign to his nature. He is often credulous and believes that the efforts to pass regulating air legislation are directed by the "Air Craft Trust" with the sole purpose of freezing out the small flier. He argues that it is his own neck which he is risking and that he is the only real judge of whether his plane is in shape or not. He feels that he is the man who at the risk of his own life, and often at great financial sacrifice has developed civilian aviation in this country and that it is he who is keeping it alive and that it is all wrong for any one who is not a flier to tell the flier what he is or is not to do.

The point of view of the men who are doing most of the commercial flying in this country is of real importance. There is a growing feeling that associations and laws for the promoting of flying must be built on the foundation of the efforts of those who are actually doing the flying in the United States. The Winslow bill at least in its original form seems to have had many of its provisions framed to apply to the larger aircraft companies and to be really somewhat out of touch with the needs and limitations of the private owner or the small companies as they now exist in the United States.

The public has a right to demand licensing and inspection of planes and various regulations such as are applied to automobiles and motor boats. Such regulations should be so framed as not to be a burden to the individual owner but that they would be a real help in inspiring the confidence of the public. Most of the professional civilian pilots are excellent fliers and are flying perfectly sound machines. Laws which would assure the public that there were no exceptions to this rule would help the great majority of fliers and if framed after a careful study of the particular problems of the individual and with the idea of helping the private flier they would not be burdensome.

## The Air Habit

AT the recent annual dinner of the British Institution of Naval Architects, Lord Thomson, the Air Minister of Great Britain made some pertinent remarks regarding the development of civil aviation. He said he wanted "all the best brains, all the public spirit, and all the intelligence of this country" enlisted in the cause of developing aviation. Having briefly outlined the Empire's position in relation to aerial communications, he spoke of its vital need for improved services, and expressed the opinion that the success of civil aviation depended upon the encouragement of "the habit of the air." He said:

"What I believe has got to come to pass in regard to civil aviation is that we must produce some sort of flying apparatus which will enlist the activity of young men who are anxious to break their necks at doing something, but want that something to be fairly cheap. I believe the future of aviation lies in the encouragement of the habit of the air. We became a great maritime State because our people had the habit of the sea. We have got at all costs to encourage the habit of the air, and I believe that in those three methods we may find the key of the situation."

## When Is a Flier at Sea?

UNDER present construction of the existing laws, the Navy cannot allow a pilot credit for sea service except when he is actually at sea. Even though he be assigned to the Shenandoah, for example, and making daily flights from her station at Lakehurst, this is not construed as "sea service," but duty on land. The fact that the airship, or an airplane, for that matter, is in its element when flying over land or sea, makes no difference according to decisions of the Naval authorities, who count sea duty in promotion and future assignments.

However, the question of new legislation amending this anomaly is being considered by a board of the Navy Department, it is understood. Under the proposed law, if the Shenandoah were cruising with the fleet at sea, the service of those on board would be construed as actual sea duty and their records would carry the time of such duty.

# Admiral Moffett Claims All Sea Flying for Navy

## Chief of Naval Bureau of Aeronautics Asserts Army Should Stop Activities at Coast Line

The testimony of Rear Admiral W. A. Moffett, Chief of the Bureau of Aeronautics, before the joint Military and Naval Affairs Committee of the House on the duplication of functions of the Army and Navy Air Services was largely in the form of a prepared statement. It states very clearly and forcefully the Navy's air policy. Owing to the importance of some of the statements made it is desired to print it very fully and to do so it is printed, owing to lack of space, almost in its complete form in smaller type than would be required were it abbreviated:

"A great deal of testimony has been given by officers of the Army upon the mission of the Navy in case of war, with particular reference to the employment of naval aircraft. This testimony may tend to mislead the committee as to the mission of the Navy in the conduct of naval warfare, and may work to the embarrassment of the Navy in the future operations on the sea, and in appropriations that may be made in the future by Congress.

### *Coordination of the Services*

"Aviation in the two Services is coordinated first by the Aeronautical Board, whose recommendations are acted on by the Joint Board, subject to the final approval of the Secretary of War and the Secretary of the Navy. The Joint Board acts as a coordinator of all fighting arms of both services. This Board is composed of the highest ranking and most experienced officers of the two Services—General Pershing is present Chairman of the Joint Board.

"The record of the hearings would make it appear that the missions and duties defined in the pamphlet 'Joint Army and Navy Action in Coast Defense' which were drawn up by the Joint Army and Navy Board and approved by the Secretary of War and the Secretary of the Navy were promulgated before the passage of the law affecting the two Services. This is not in accordance with the facts. That pamphlet was prepared and the forwarding letter was dated June 5, 1920. This pamphlet was drawn up for the purpose of avoiding duplication of effort and securing cooperation and coordination of the various forces involved, and the Bureau of Aeronautics has strictly complied with these regulations and has never questioned them in any way, nor contemplated doing so."

* * *

It is desired to emphasize that the Fleet consists not only of the high seas fleet, battleships, aircraft carriers, cruisers and destroyers, but all naval vessels, including submarines, subchasers, fuel ships, transports, convoy and patrol vessels. This being a fact the contention that it is legal for the Navy to have shore stations whose maintenance is necessary only for operations connected solely with the main battle fleet is untenable, and is based on a misconception of the functions and requirements of the Navy and what the fleet really is.

The regulations of the Joint Board were drawn up in the light of the existing state of aviation, and of all of the other elements of national defense at that time, and have since been revised from time to time by the Joint Board. The Navy has adhered to these regulations, and has been governed by them in the development of its aircraft, of its training, and of its Naval doctrine. The Navy is at a loss to understand why this point has been raised at this time, or at any other time, because from the Navy point of view the very object of these regulations has been to prevent unnecessary duplication of the primary functions and facilities of the operating forces of the Army and the Navy.

### *What the Navy Controls*

These regulations specifically provide that the Navy shall control all shipping, including convoys, radio communications relative thereto, the coastal seaplanes and scouting. This is necessary because the experience of past wars has clearly demonstrated that the Navy must be responsible for and therefore must control all shipping on the seas

* * *

For the purpose of protecting the Allied lines of communication, the United States Navy sent abroad many of its seaplanes which maintained a continuous air patrol over the coastal sea lanes on the converging lines of the shipping of the world. Engaged in this work were not only the Naval seaplanes, but also the mine layers, mine sweepers, subchasers, the submarines, shore radio and signal stations

During all of this time the combined aviation forces of the Allied armies were engaged on the battlefronts of the continent.

* * *

Should a strong enemy aircraft offense escape our fleet at sea, and be pressed home against our shores, we would rely upon all of the available agencies both of the Army and the Navy to repel it. This is quite in accordance with the existing instructions of the Joint Army and Navy Board which I will quote.

### *Air Operations Against Enemy Attacks*

Cooperation between Army and Naval officers directing operations against enemy attacks will be governed by the following principles:

(a) When an enemy force of a strength greatly superior to that of the naval force available for use against it approaches the coast, the Naval officer will inform the Army officer of the situation and shall assume that the Army has a paramount interest in the operation and shall coordinate the operations of the naval forces with those of the military forces.

(b) If, however, the conditions are such that the enemy is or can be, engaged by a naval force approximating in strength that of the enemy, the Army officers shall be so informed and shall assume that the Navy has a paramount interest in the operation and shall coordinate the operations of the military forces with those of the naval forces.

(c) In the application of these principles, it is assumed that both the Army and the Navy have forces suitable for operating against enemy attacking forces, one service obviously could not be given a predominating interest in frustrating an enemy attack, if it did not have available forces which were suitable for operations against the attacking forces, even though the other service were greatly inferior in strength to the attacking force."

Planes attacking our coasts must be brought overseas in ships, as no airplane that has been built, or that is likely to be built for years to come, could fly across the ocean with its military load and much less return to its own shores after the attack. The situation among the European Powers is quite different, for they are within easy flying distance of one another. But even in Europe where the conditions are so favorable to hostile air attacks, the defense of the coast is more generally allocated to the Navy than to the Army.

### *Where the Army Dissents*

The Army Air Service questions the necessity of Naval air bases and intimates duplication therein. Seaplane bases must be on the water and have runways for handling seaplanes. The Army air bases are inland. It is impossible to land seaplanes safely on the ground and impracticable to transport them from the coast by rail to inland Army air stations. Naval air bases are needed not only for the planes of the high seas fleet but for the planes of the Naval District forces engaged in convoy, patrol and scouting. Naval aircraft bases on shore are as necessary to naval aircraft as navy yards are to ships.

The Army Air Service, it appears from the testimony, also desires to restrict Naval Aviation to the high seas fleet and to take over convoy, patrol, and scouting, using landplanes for these purposes. If a landplane lands on the water, the plane will be destroyed, and even at best will float but a short time, involving the death of the personnel unless picked up by a passing vessel. A seaplane will not only float but can take off again. Minor repairs may be effected on the water and the plane can continue its mission. It is necessary in time of war for planes to land on the water and actually send boarding officers on board surface craft to determine their character.

To send flying personnel several hundred miles to sea in landplanes to patrol the extensive sea areas that must be covered daily, month in and month out, in routine patrolling, even in a war of comparatively short duration, would involve an unnecessary sacrifice of lives in work that could be just as well done without such sacrifice, to say nothing of the loss of planes when most needed. Even in time of war, this routine patrolling in landplanes without the incentive of an immediate engagement with the enemy would have a demoralizing effect on the personnel.

In the summer of 1921 the Navy Department carried on a series of problems involving the use of aircraft in an attack by a supposedly hostile Naval force against our shores. For this purpose the U.S.S. Iowa was used. The problem was a search for, and attack upon, the Iowa by aircraft. There were available in the Chesapeake Bay area for this purpose about twenty Naval seaplanes and about eighty-five Army landplanes. The Iowa was to be somewhere in a belt extending from Cape May to Cape Hatteras, not less than fifty miles and not more than one hundred miles from the shore.

For the safety of the personnel, twenty destroyers were assigned to the

Commander of the defending Naval air force, which he could place in such position as to best cover this water area for the purpose of rescuing land aircraft that might come down.

The Navy Department invited the Army Air Service to participate in this problem, but the Commander of the Provisional Air Brigade at Langley Field declined to take part in the search on the ground that flying so far from shore in time of peace would not be justified by the results obtained and the risks involved. On this occasion, the weather was fine, and Naval vessels were in the vicinity to afford assistance if needed. In war the problem would be more difficult. Yet it is necessary to train in this kind of work during peace if we are to do the work well in war.

## The Naval Doctrine

In patrol, scouting, and convoy work, unity of command and control is absolutely essential, with personnel trained and indoctrinated in Naval methods, tactics, seamanship, navigation, and familiar with the characteristics of all types of Naval and merchant craft. They must also be proficient in Naval radio and signals, including recognition signals, otherwise they become a menace and danger to our vessels. Furthermore, the air personnel of the aircraft and planes should be under the control of the Naval commander at all times to insure their preparation, efficiency, and readiness. If under another branch of the Government, who would decide what planes and personnel were needed for any operation? Who would be held responsible for inefficiency, or even failure of planes to arrive on time, or at all, when needed? Would not divided responsibility result in delay in sailing of convoys, inefficiency and perhaps disaster?

Referring to the question of possible duplication in training and experimentation, there is very little duplication. Teaching a man to fly is but a small part of the training necessary. The Navy Department's policy is first to train the man to be a Naval officer. He spends four years at the Naval Academy and then goes to sea with the fleet for three years to acquire the practical Naval training deemed necessary before he is eligible to take up the additional training to become a Naval aviator. He is then selected from volunteers at the end of his sea cruise, and if he has passed the required physical examination is sent to Pensacola, where for at least six months he is instructed in the Army of flying the various types of Naval aircraft, after which, if found proficient, he is again sent to sea in the Naval Operating Units before he is considered to be of real value as a Navy pilot. Please note that we consider that it takes about 8 years to make an efficient Naval pilot. The training, therefore, is fundamentally different from that of the Army Air Service, and it is believed that each of the existing systems of training meets the requirements of the respective Services. Should a consolidation of that part of the training as involves only flying be considered, attention is invited to the fact that this training still differs considerably in the types of aircraft flown, and also to the fact that Pensacola, the only Naval flying school, is situated on the seaboard, whereas the Army flying schools are, I believe, not on the seacoast. It would be a great waste of money to do away with Pensacola because of the investment already there. At one time the Army trained our personnel in flying landplanes, but this is now done at Pensacola to avoid the necessity of sending our men to two places. At Lakehurst, N. J., several Army officers and men are receiving training in dirigibles.

## The Question of Duplication

The question of duplication with regard to experimentation is ready answered and is briefly contained in my hearings before the Senate Committee on Appropriations. If we were just beginning, it might be practical and economical to combine our experimental plant at Philadelphia with the Army plant at McCook Field.

There is, however, already a large investment in both plants and there is no suitable place available to join them. Their requirements are different, for one pertains to the sea and the other to the land. A joint station must be on water with large land facilities. This is a question of appropriations for a joint station suitable to the needs of the two Services. It involves a loss in investments in the present plants and enormous reinvestment in a combined plant.

One of the basic reasons for discussing this matter at all was the question of duplication between the Army Air Service and the Naval Air Service. There is considerable misconception with regard to this matter. It is quite possible to have legitimate duplication. In some cases a certain amount of duplication is absolutely essential in order that progress may be made, because it engenders a spirit of rivalry which is not only productive of increased efficiency on the part of both services but is productive of marked improvement in procedure, design, construction, and operation. I believe in economy in every particular, but it is quite possible to obtain false economy by a lack of understanding of fundamentals. Take, for example, the blocks of buildings now occupied by the Navy Department and the War Department on B Street between 17th and 21st Streets, Northwest. It is quite conceivable that by combining these buildings under one head, a certain amount of overhead could be eliminated and a certain amount of economy obtained so far as actual expense involved is concerned. On the other hand, the net result would be inefficiency and in some cases a veritable Tower of Babel condition would obtain.

With human nature constituted as it is, it has been, and apparently will be, it is absolutely essential to have unity of command in any military operation or any of the primary functions thereof. It, therefore, seems to me that if there is any duplication on any of the matters which have been so ably discussed before this committee, that the duplication is on the part of the Army Air Service, as it is inherently and naturally and logically the function of the Navy and the Naval Air Service to perform the duties outlined and to have under their jurisdiction the facilities outlined and to have under their jurisdiction the facilities pertaining to these duties.

The design features of airplanes have been referred to casually. There may be an impression that Army planes and Navy planes are one and the same thing. This is not correct. Naval requirements are that the Navy must have planes capable of landing on the water, on the deck of a carrier, of being launched from catapults, and of taking off from the water or from the deck of a carrier. One only need mention the subjects of single pontoons, twin pontoons, triple pontoons, flying boats, wing tip pontoons, wooden floats, metal floats and similar purely Naval plane fittings, to indicate to you the inherent differences between Army planes and Navy planes. Furthermore, there are amphibian planes capable of landing both on the deck of a carrier and on water without any conversion whatsoever. Of course. the plane which lands on the deck of a carrier can land on land, but it does not necessarily follow that the reverse is true. With the greater loads that Navy planes are required to carry, due to their essential Naval purposes, specifications for a plane suitable for normal land work must be radically changed throughout to make that plane suitable for normal Naval work.

## Types of Naval Aircraft Needed

Naval Aviation should possess scout planes, bombing planes, torpedo planes, observation planes, training planes, patrol planes and fighting planes of types suitable for their Naval work.

On the carriers the Navy will have fighting planes for the protection against aerial attack observation planes for observation of the gunfire of the fleet; and a combined bombing and scouting and torpedo plane for obtaining information for the fleet, torpedoing and bombing the enemy surface craft and bases.

In the Naval Districts the Navy will have patrol planes and torpedo and bombing planes. The patrol planes will be used for the purpose of insuring the presence or absence of the enemy forces within certain area; the torpedo and bombing planes will be used to attack enemy surface vessels lying within the area. All the duties enumerated above are in accordance with the approved policies of the War and the Navy Departments.

The aircraft carried on carriers are all what is termed convertible land or seaplanes or what is termed amphibian land or seaplanes. It is necessary in Naval design during peace time and war time to have a plane that can land on water and insure to the personnel a reasonable chance of safety. In time of war, in an emergency when the highest performance is necessary, it is contemplated putting on the land wheels and operating certain aircraft as landplanes only. From the Naval Districts it is contemplated having seaplanes only, as it is considered essential among other duties, that the seaplane be capable of landing on the water to enable sending a boarding officer aboard surface craft.

There is no duplication whatsoever between the functions and missions of Naval aircraft and Army aircraft, nor is there a material duplication. The Naval aircraft constitute what might be termed the first line coastal defense. The Army aviation with their faster planes would constitute what might be termed the second line of coastal defense. In other words, the Army aviation aircraft would be utilized as a reserve force for the Navy if the enemy penetrated the Navy first line of defense. This shows that there is no duplication of missions.

Naval aircraft, by virtue of the fact that on carriers they have to be made heavier and stronger than Army aircraft, due to additional strains of landing on board and catapulting, have as a consequence a lower performance. The Naval aircraft operating in Naval Districts with their pontoons or boat equipped are also of lower performance. It is therefore important, to insure perfect protection of coast, that we have a reserve force that under all circumstances would be equal to or better than any enemy attacking force of aircraft, and it is there that the country would depend on the landplane operated by the Army Air Service.

## Present Coast Defense Law

The history of the present law governing the Army Air Service and the Navy's aviation in coast defense has been partly disclosed before this committee by an officer of the Army Air Service. It was the evident intent of the influences behind the passage of the part of the law as it first passed the House, namely "that the Army Air Service shall control all aerial operations from land bases, and Naval Aviation all aerial operations attached to a fleet" to absolutely separate the Navy's aviation from the shore, and for the Army Air Service to automatically take over the Navy's shore aviation bases, stations and activities. It has been shown that this legislation

(above) was proposed and passed without the knowledge of the Secretary of War, Navy, and Joint Board, and presumably without consulting this committee. As originally passed, this legislation would have wiped out Naval Aviation, stopped all Naval Aviation development, and would, had war come, meanwhile, have seriously crippled the fleet. The Navy without adequate Naval Aviation would have no chance whatever against a fleet adequatelye quipped with Naval Aviation material and trained Naval Aviation personnel.

Fortunately, the Navy Department discovered the passage of this legislation on an Army appropriation bill in time, and after energetic protests on the part of the Secretary of War and the Secretary of the Navy, the legislation was amended in conference by members of the Congress who appreciated what effect it would have, and in a way it may be presumed satisfactory to both heads of the two great departments.

If there is any possibility of the present law being construed to mean that the Navy can only have shore bases for the operation of planes attached to the high seas fleet, eliminating scouting, convoy, and patrol planes, then I say new or additional legislation should be passed at once, or this law should be repealed. This committee can best decide this question. Otherwise, I concur with the Assistant Secretary of the Navy that no additional legislation is needed at the present time.

### *Army and Navy Cooperation*

As regards cooperation, I am glad to be able to testify as to the cooperation that has existed between Army and Navy aviation since General Patrick has been Chief of the Air Service, and I heartily concur in what he has said on this subject. I have known that his opinion differed from mine to some extent as to the necessity for Naval air bases. I believe that these hearings will prove of great value, that Congress will be better able to appreciate the problems both the Army and Navy are trying to solve in aviation, that you will be convinced that duplication in material, experimentation, and training does not exist except to a minor and unavoidable degree; that the two Services are cooperating harmoniously and effectively for the common good of the two Services—aviation and our country.

These extensive hearings originated in a discussion on the question as to the Navy's acquiring a site at Sand Point. The Navy has never attempted to establish numerous airplane stations along the coasts, but it is vitally essential that the Navy have fleet air bases located at such localities as are necessary to insure the security of our lines of communication in war and protection of our coastwise and seaborne commerce. The appropriation bill provides that no part of the appropriation shall be expended for maintenance of more than six heavier-than-air stations on the coast of the continental United States. We have asked for legislation to secure an aviation site at Sand Point, Wash., which is needed by Naval Aviation on the Pacific coast.

I am in entire agreement with the Committee in its desire to spend as little money as practicable on shore, and to keep the number of shore stations to a minimum. It has been the constant endeavor of the Bureau of Aeronautics to keep its shore activities to a minimum, and to spend what money is appropriated, at sea, especially with the fleet.

### *The Four Points of Naval Aviation*

In conclusion, there are four points which I should like to stress so far as aviation is concerned.

(a) Naval Aviation is an integral part of the Navy. We have no Naval Air Corps.

(b) The defense of the coast itself may rest with the Army Air Service, but the offense of the coast should rest with the Naval Aviation.

(c) It is admitted by all that our first line of defense is the main fleet. It has been thoroughly brought out here, and, I believe, accepted that the second line of defense would be auxiliary vessels of the fleet, and the third line of defense is our coast fortifications, augmented by the Army Air Service.

(d) If no legislation means that the Army Air Service is to continue questioning the rules of the Joint Board, then I say a new law should be passed. Our whole program of aircraft, types, functions, and so forth, is based upon the present rules, approved by the Secretary of War and the Secretary of the Navy. Radical changes in them, as suggested by the Army Air Service officials, would be not only disastrous to the Naval defense of the country, but would result in great waste of money.

We of the Navy are trying to carry out the regulations of the Joint Board. My feeling is only that we are trying to carry out the regulations of the Joint Board and trying to carry out what we think is the function of the Navy. We very much want to be left alone in our endeavors. I feel that we are being interfered with. I have no personal feeling in the matter.

I do not question the integrity of the Army Air Service, but I do question their knowledge and I do especially question their knowledge of nautical affairs. They have never been to sea except as passengers. I have spent twenty years at sea, and we of the Navy do know sea conditions. We know that many of the things stated here can not be done. We know that the employment of landplanes over the sea will break down the morale of the Service, and it should not be done. When landplanes go to sea they always want convoys. Such should not go to sea and they can not do it successfully. If their engines go down on them, they stop and there is trouble. Their stand in regard to the possible employment of landplanes is due to ignorance. They do not know sea conditions. Again, we have not raised this question. If the Army Air Service wishes to raise it, they are at perfect liberty to do so.

### *The "Proper Viewpoint"*

If there should be a joint Congressional committee created to investigate the subject of aviation, a representative of the Navy, in my opinion, should be on that committee or commission. The great trouble is that it is hard to get the proper viewpoint when the questions are passed upon by people on shore.

From 1920 to 1924 we have spent a total of only 5 per cent of our appropriations in buildings and improvements. In one year we spent nothing. That refers to our appropriations for aviation. It amounts to $5,000,000.

I do not think the airplane carriers cost should be charged to aviation any more than the cost of a battleship should be charged to the Bureau of Ordnance.

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## Aeronautical Engineering Course

As many of our readers have asked what the course at the Massachusetts Institute of Technology at Cambridge, Mass., covers, we are printing below a statement which will give the complete information.

The degree of Master of Science with specification in the field of aeronautical engineering is given in accordance with the general rules for the Master's Degree, at least 800 hr. work being taken, while a candidate for the degree, from the list of "A" subjects printed below, and a total of at least 1,200 hr. from the lists of "A" and "B" subjects combined. All candidates, also, must take either all the courses marked * or all those marked †, or show evidence of having previously done work substantially equivalent to that of any courses omitted from the one of these groups selected.

In addition to the subjects shown in the schedule, the student should plan to do some work on the theory of structures if he is not already well grounded on that subject. A good reading knowledge of both French and German is a prerequisite for the Master's degree in Aeronautical Engineering.

An aerodynamical laboratory with two wind tunnels gives opportunity for research in connection with the preparation of a design and the graduation thesis.

Although the work in aeronautical engineering is primarily for graduate students, the subjects listed below are also open by special arrangement to properly qualified undergraduates and special students.

*A. Subjects Primarily for Graduates*

*†Airplane Design, *Advanced Airplane Design, *Advanced Airplane Structures, *Airplane Designing, †Airship Theory, †Non-Rigid Airship Design, †Rigid Airship Design, †Rigid Airship Design, Rigid Airship Designing, Conduct of Aeronautical Research, *†Aerial Propellers, Advanced Wing Theory, Airplane Engine Design, Dynamics of Aeronautical Engines, Carburetion, Aero. Engine Cooling, Lubrication of Aero. Engines, Fuels and Combustion, Aero. Engine Laboratory, *†Seminar, Principles of Mathematical Theory of Elasticity, *†Thesis.

*B. Subjects Open to Graduates and Undergraduates*

*Advanced Calculus, *†Theoretical Aeronautics, Mathematical Laboratory, *†Airplane Designing, Non-Rigid Airship Designing, *Aeronautical Research Methods, *Aeronautical Laboratory, Aerial Propeller Designing, Aircraft Instruments, Aerial Transport, History of Aeronautics, *†Machine Design, *†Physical Metallurgy.

# Notes on the Design of a Corps Observation Plane

By HAROLD F. MARSHALL
First Lieutenant A.S.O.R.C.

It was interesting to compare the Air Service requirements for new Corps Observation planes, recently published in AVIATION, with notes made on the subject by the writer from time to time over a period of eight years. Being based mostly on the actual Corps Observation flying experience of myself and others in the 88th Squadron at the front, and on flights made in most of the principal types of Corps Observation planes, these comments are offered in the hope that they may be of constructive value, and a useful supplement to the Air Service announcement.

### *Exhaust Silencer Desirable*

In comparing the engines now available with those used in Corps Observation work toward the end of the war, one sees above all, engines of greater reliability, quicker starting ability and greatly increased power.

There does not appear to have been any attempt at silencing the engine, a move that would be a decided advantage. Points one and two are welcomed. Point three must be subject to the question—"Where does the greater power get us—in increased speed, climb and load ?"

A comparison of some of the war service ships with the possibilities of the new requirements will prove interesting.

TABLE SHOWING PERFORMANCE OF SOME WELL KNOWN CORPS OBSERVATION PLANES IN COMPARISON WITH THE NEW AIR SERVICE DESIGN

| *Type* | *Hp.* | *High speed* | *Climb* | *Endurance* |
|---|---|---|---|---|
| Salmson | 270 | 116 | 6,500 ft. in 7¼ min.<br>10,000 ft. in 17¼ min.<br>16,500 ft. in 40¼ min. | 2¾ hr. |
| Breguet (Renault) | 300 | 112 | 5,000 ft. in 2½ min.<br>16,500 ft. in 21¾ min. | 3½ hr. |
| DH4B (Liberty) | 400 | 124 | 6,500 ft. in 8½ min.<br>10,000 ft. in 14¾ min.<br>15,000 ft. in 33¾ min. | 3¼ hr. |
| Halberstadt (Mercedes) | 180 | 115 | 5,000 ft. in 9¼ min.<br>10,000 ft. in 24½ min.<br>14,000 ft. in 52 min. | 2½ hr. |
| Proposed A.S. Design | 400-650 | 150 | 15,000 ft. in 20 min. | 3 hr. (450 mi.) |

One is inclined to believe the increased high speed and climb are well worth the power. But while on the subject of power plant, it might be well to emphasize the desirability of having the engine well-housed. In Corps Observation work there is a lot of "cold-engine" flying—floating around throttled down, looking for landmarks, troops, etc.,—long easy glides while an observer writes up a report to drop at a panel station or fuss with a balky radio—a lot of time when the engine is at a relatively low loading.

Ample housing, thermostatic regulation of circulation and tight shutters, so that the engine will keep warm and take the gun *suddenly*, without balking from cold, are worth while.

An experience is recalled which may illustrate this point. After a rather long mission, in which a lot of important information had been gathered, we were cruising around while our observer was writing his report to be dropped at the divisional headquarters. The engine was throttled and the ship was gradually losing altitude, to conserve gas, the front having moved ahead so fast that our field was rather far in the rear, and we figured to be nearly "out" on landing home. Suddenly a Boche "dropped" a near-by balloon and headed for his lines. We pulled up sharp, opening the throttle wide—past the *point de danger*—we'd take a chance on rupturing an engine for the sake of a good shot at the fleeting Boche. We still believe we lost him because our engine had cooled so that it didn't respond.

### *The Cockpit Arrangement*

Turning next to the general specifications, one notes that a two-seater is called for, but nothing is said about the arrangement, other than *"All seats and cockpits shall be arranged with due consideration to the comfort and convenience of the crew."*

We believe this factor deserves more weight. A Corps Observation pilot and his observer are "married," to use an old service term. Success in their work depends largely on the degree of cooperation they can achieve.

Handling the machine, route finding, enemy lookout and maneuvering are the pilot's half, and the observer, despite his maps, guns, camera, radio and reports ought to spend most of his time watching the ground. And continuous intercommunication, without difficulty, should be possible. There are probably satisfactory electric phones by this time—a decided preference for the rubber tube phone used on the Salmson was observed at the front. They worked, at any rate.

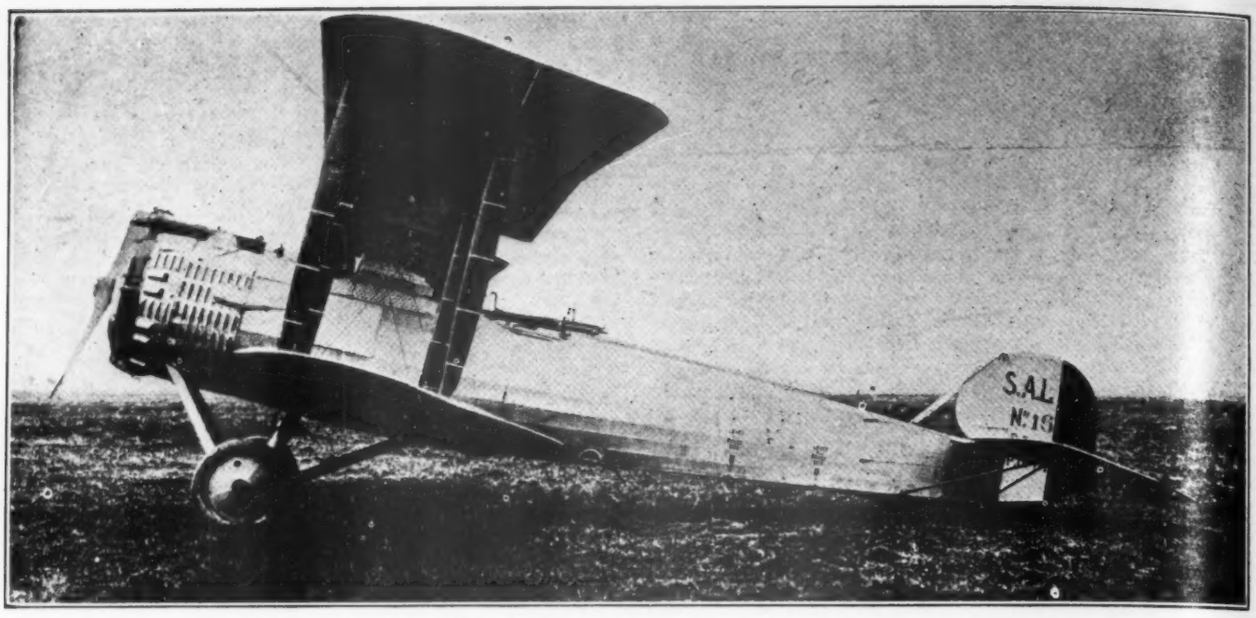
A deep fuselage, like the Halberstadt, where the observer could talk into the pilot's ear, completely protected from the wind, is the best arrangement for communication.

### *Provision for Overload*

More than a few times were busses overloaded to carry two pilots in the rear cockpit back to a replacement depot, as the quickest means of getting new ships up to the front. This suggests that room enough to carry a third man would be worth providing, particularly as it could be done simply by allowing ample roominess in the rear cockpit.

A Corps Observation squadron in the field will always have plenty of occasion to carry an overload if it can be done.

*Halberstadt two-seater corps observation plane (180 hp. Mercedes engine), used by the German air service*




*Salmson two-seater corps observation plane (270 hp. Salmson radial engine) used at the front in 1918 by the U. S. Army Air Service*

Speed and fast climbing are always welcome and will never be in too great supply. As to service ceiling, "the higher the fewer" will always hold true.

### *Cruising Range is Important*

One does not wholly agree on the cruising range, and believes this is one of the most important questions in a Corps Observation ship. One remembers several reconnaissances which required over 4 hr. in a Salmson—one of 6 hr.—and one Frenchman who was in the air 7½ hr. in a Bréguet on a special mission. Exceptions, possibly, but consider the time of a typical artillery and reconnaissance mission. It might be split up as follows:—

| | |
|---|---|
| Getting to the front | 30 minutes |
| Orienting self | 2 " |
| Calling panel station | 5 " |
| Run from enemy | 3 " |
| Getting artillery panel station | 5 " |
| Observing and correcting fire | 35 " |
| Making sector reconnaissance | 20 " |
| Flying around back of line while observer prepares report | 10 " |
| Flying to divisional panel station | 5 " |
| Flying to corps panel station | 15 " |
| Flying to home field | 10 " |
| Awaiting turn to land on crowded field and for radio reel to be wound in | 5 " |
| | 155 min. or 2 hr. 35 min. |

The above is not hypothetical, but typical and based on A.E.F. experience. It will be noted that 1 hr. 27 min. of the total are required for "cruising" in which distance covered is generally unessential. A longer mission would usually increase the proportion of "cruising" time. One believes therefore, that while 450 mi. "full out" may be enough, at low speeds one should be able to fly 6 to 7 hr. without landing.

It would seem that conditions in America, with its long distances and lesser density of population, must inevitably lead to more open warfare. It is obvious that this alone will greatly increase the flying time necessary for completion of each mission.

### *Landing Speed*

Next is noted the maximum landing speed of 60 mi./hr. And it is hoped that at least 50 mi./hr. and less, if possible, will be attained. In Corps Observation work, ability to land and get out of a small field means ability to land nearer a post of command and make a quicker report. And this is where time is of the essence of things, and aside from the safety and other advantages of slow landing.

The cockpit arrangement has already been mentioned. It is believed that for a Corps Observation plane this question, we repeat, deserves more than two points weight under miscellaneous. One wonders why the cockpit width has been fixed at 32 in.—true, this is the limitation at the scarf, but a bulge below might prove useful. Furthermore, one regrets the limitation that "the distance from the floor to the top of the scarf mount shall be 42 in." It seems equivalent to saying that the ship must be as windy as DH4. The best point of the Bréguet, as a Corps Observation ship, is its depth, which gives the observer real wind protection. One would rather that the specification fixed the distance of 42 in. from a firing platform to the scarf mount, and let the floor come as far down as the designer's ingenuity can make it.

### *Reporting the Observation*

One of the Corps Observation observer's problems is that of writing reports and making sketches. This is really a serious problem on reconnaissance work. Corps reconnaissance has for its object gathering information and making it quickly available. We have often thought that a light-weight dictaphone, eliminating the burdensome and time-consuming writing and permitting the observer to dictate much more complete data without interrupting his study of ground and maps, might be an improvement. Of course, a dropping tube sufficiently strong to protect the recording cylinder would have to be provided.

In the recent war, radio was too often just one step better than useless, but its more recent development may change the situation. If a plane can be made a broadcasting station, obviously the necessity for writing will be done away with.

We have touched on ordinary reconnaissance and artillery regulation which, however, are only two of the Corps Observation squadron's jobs. Photography, requiring altitude, and low flying liaison missions are two *extremes* which indicate the range of duties required of a Corps Observation plane.

Oblique photography presents no particular problem except that of providing an easily handled camera mounting which at the same time does not interfere with the observer's gun-handling. We have always thought that a low camera mounting—"shooting" through the fuselage, but operated by a removable linkage which brings the camera sighting within reach of an observer standing at "ready" with his guns, would be workable.

The requirements for vertical photography are generally better known than those for other types of Corps Observation work. One point may perhaps be recalled to advantage. It is this—reduce the percentage of false starts necessary. One believes the past average to be about seven false starts per successful mission. This was largely due to lack of climbing ability caused by either failure of the engine to keep turning up full power until the desired altitude was reached, or inability of the plane to climb because of minor errors of alignment which developed in service. Re-alignment of wing-incidences would be necessary before the attempt at altitude would succeed. Plenty of excess power will overcome this.

The Corps Observation plane designer should not forget that the active front "day" is not one of 8 hr.—it is more liable to start at around 3 a. m. and end around 9:30 or 10 p. m. And while early morning fog kept Pursuit outfits on the ground (no reflections on the Pursuit outfits, they simply were not needed) Corps Observation planes were successfully zooming up through the fog and getting excellent long-distance reconnaissance results. This was particularly the case in rolling country like the Argonne, for the fog follows the ground contour, and one has thus an excellent relief map as a guide. Under cover of this ground blanket one could get well across the lines, then, as the sun burnt "holes" in the fog these holes would be circled. Excellent surveillance and considerable annoyance to the enemy resulted. Of course, in a flight of this kind great trust was put in an engine, the mission was long, and the return journey a "full-out" run for home, under fire.

Besides flying over fog, contour flying in heavy mist is also necessary in Corps Observation work. Fog and mist most effectually stop all ordinary methods of ground liaison, and enhance the difficulties of the command. It is under these conditions that Corps Observation liaison can be of *most* help to the ground organizations.

Selling the Air Service to the army unit commands is one of the Corps Observation squadrons jobs—and sucessful liaison flying in a fog is one of the best ways to accomplish it. This means contour work and it means "instrument flying." It means a long time in the air—flying from landmark to landmark, and working from a base of some sort at the front, making sortie after sortie, searching the ground, and tieing what one sees into this base to locate it.

Certainly it should be possible to produce a Corps Observation plane far in advance of those used during the war. But the further one gets from actual war experience the greater the tendency to stress performance at the expense of detailed fitness for field operations. If these notes will serve to put a little more vividly in the mind of the designer the picture of the actual conditions under which his product must operate in wartime, they will have served their purpose.

## LAKEHURST AIR DEMONSTRATION

The Air Demonstration which will be held on May 31 at the naval air station at Lakehurst, N. J., promises to be one of the biggest events of its kind ever attempted in this country. Visitors will have an opportunity to view there an extraordinary aggregation of lighter-than-air craft, such as the Shenandoah, non-rigid airships, kite balloons, free balloons, comic hopping balloons, etc. for the Navy has concentrated all of its L.T.A. activities at Lakehurst.

In addition to these craft different types of airplanes will also be demonstrated. Lieut. "Al" Williams, U.S.N., Lieut. David Rittenhouse, U.S.N., and Lieut. D. Allen, U.S.N., will pilot a stunt formation of three Vought planes, which will perform in unison all sorts of aerial fighting maneuvers, such as loops, spins, rolls, etc.

Two pilots will stage a "dog fight," which in aerial parlance is a sham battle in the air in which the two pilots loop, spin and roll to gain an advantageous position to "strafe" the opponent with a machine gun, simulating wartime combat.

It is also planned to stage a quadruple parachute race, four men jumping off a Martin Bomber from a height of 3000 ft., the one reaching the field first to win.

Lakehurst can be reached by automobile over good roads from New York (70 mi.), Atlantic City (60 mi.) and Philadelphia (50 mi.).

Special trains will be run to the Lakehurst Hangar from New York, Newark, Jersey City, etc., and from Camden and Atlantic City.

The program lasts from 10:30 a. m. to 4:00 p. m. Admission is free.

## 6TH BALTIMORE AIRCRAFT EXHIBITION

The Flying Club of Baltimore is holding its Sixth Annual Aircraft Exhibition on Memorial Day, May 30, the show to commence at 2 p. m. This is the sixth consecutive show held on this date, the first show being held in 1919, when Logan Field was a deserted farm.

All available planes from nearby flying fields will be sent to this exhibition. Langley Field, Bolling Field, Phillips Field (Aberdeen), and the Naval Air Station at Anacostia will participate.

The First Event is scheduled for 2 p. m. and will be a precision flying contest for pilots of the Air Service of the Maryland National Guard, who will compete for the cup which was donated by the Flying Club and has been competed for annually. The cup is now in the possession of Lieut. Sylvan Gusdorff who won the contest last year. The conditions are that the pilot must climb to 2000 ft. throttle his motor and spiral to a landing at a mark. The winner will be determined by the formula $N = \frac{10S}{D}$; when $S$ is the number of spirals and $D$ is the distance in flight from the mark.

Event No. 2, scheduled for 2:45 p. m., will be a series of what might be called "described stunts." A pursuit plane will take the air and go through all of the various stunts known in flying. At the same time the announcer will tell the crowd just what is going on.

Event No. 3, scheduled at 3:20 p. m. will be an attack on a two-seater plane by two pursuit ships. The observer will leave the two-seater by parachute.

Event No. 4, scheduled at 3:20 p. m. is a handicap race which will be participated in by SE5's, DH's, XB1A's and Thomas Morse MB3's. Langley, Bolling and Phillips Fields will be represented in this race.

Event No. 5, scheduled for 4 p. m. will be the bombing of a dummy fort on Logan Field by a detail of three Martin Bombers from Aberdeen Proving Grounds. Each plane will carry 100 lb. of smoke bombs and will make three attacks against the fort.

Event No. 6, scheduled at 4:40 p. m. will be a small plane race. The tiny Sperry Messengers from Bolling Field will participate. In addition it is expected that the Farman Sport plane will also enter this race.

A smoker will be held at the Southern Hotel Roof after the show on Friday night and all pilots participating are requested to attend the smoker.

## Our World Fliers Span Pacific

The Air Service's world cruise planes, Chicago, Boston and New Orleans, which landed at Chicagoff, Attu Island on May 9, were delayed for several days by high winds, rain and snow. The U. S. Coast Guard cutter Haida, then at Attu Island, had to put to sea for safety but the planes anchored in a small cove rode out a sixty mile gale safely. "Woolies" and high seas made it inadvisable to proceed. However, on May 16 the three fliers left Attu at 11:40 a. m. After flying for three hours they were forced down at the Komandorski Islands which belong to Russia and are off the coast of Kamchatka. This was off of their scheduled course, as diplomatic relations have not been established between the United States and Russia, but in avoiding the storm the fliers showed good judgment and excellent ability in navigation. After a three hour wait for the storm to abate the fliers proceeded to Kashiwabara Bay, Paramashiru. The American destroyer John D. Ford and two Japanese destroyers had been expecting the planes for a week, as the weather had been excellent, but on that particular day a storm had arisen and they sent out a warning not to attempt the flight. They were therefore amazed when at 11:30 a. m. they heard the drone of the motors and Lieutenant Smith's plane appeared out of the haze, flanked by the ships of Wade and Nelson. The elapsed time between Attu Island and Paramashiru was 15 hr. 35 min. The flying time was 12 hr. 5 min. and it is estimated that the altered route was about 900 mi. in length. Due to the fliers traveling westward there is some confusion as to what time was referred to in giving the landing hour, but the Navy Department seems to think that the last part of the flight was made at night. This is the first flight from America to Asia, and considering the weather it is a most praiseworthy performance.

Bad weather delayed the planes one day at Paramashiru, but on the 19th they hopped off for Hitokappu Bay, Yetorofu Islands, at 7:35 a. m., a distance of 500 mi. The Japanese destroyer Hamakaze which is assisting the fliers had proceeded to a point half way between the two islands. After a seven hour flight the planes landed on Lake Toshimoe, back of Hitokappu Bay, where buoys had been placed in sheltered water by the crews of the U. S. destroyer Pope and the Japanese destroyer Amatsukaze.

The fliers have on board an ordinary compass and the new Pioneer earth inductor compass which seems to be working out very well. The delay among the Aleutian islands will make the fliers go through the Chinese area during the typhoon time.

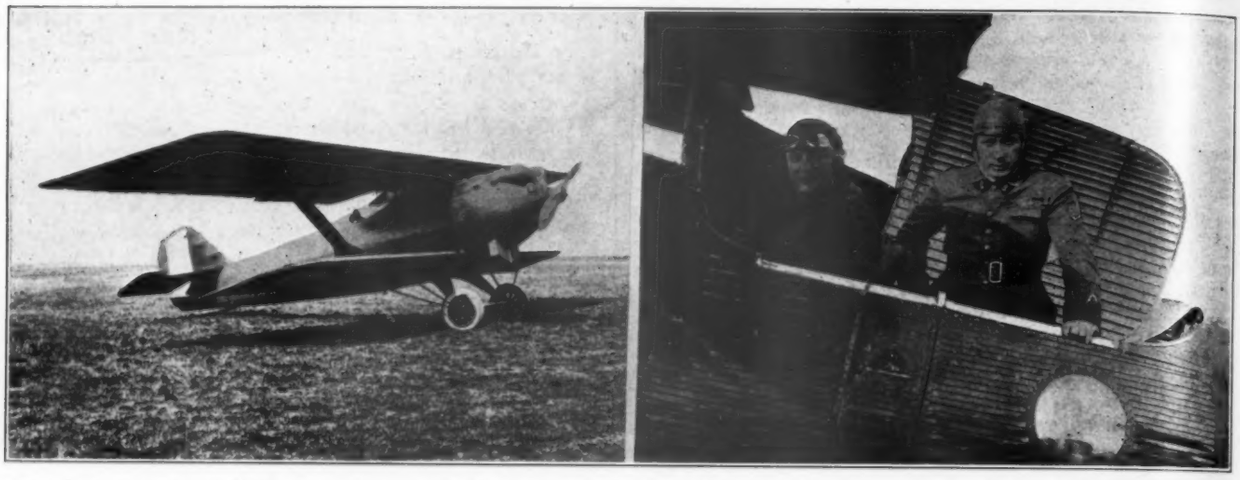
Major Martin left Port Moller, Alaska, on board the steamer Catherine D. and he should arrive in the United States June 1.

## Paris to Tokyo Flight

Capt. Peltier d'Oisy and Sergeant Vésin are keeping up the remarkably fast gait they struck when they started on their Paris to Tokyo flight, on April 24.

On May 13 the two airmen flew from Saigon to Hanoi, the capital of French Indochina, a distance of about 800 mi. There d'Oisy found a cablegram from the French war minister, promoting him to the rank of captain, and awarding to Vésin the Médaille Militaire, for their great flight. At Hanoi the 400 hp. Lorraine engine which had served the fliers without any trouble for 9000 mi. was replaced by a new engine of the same make and power, as was originally scheduled, for the original engine was in perfect condition and probably would have held out until Japan was reached.

On May 18 the fliers hopped off from Hanoi and made Canton, South China, a distance of 620 mi., in 5½ hr., flying most of the time in downpours of rain. Dr. Sun Yat-sen, President of South China, personally welcomed the fliers on the airdrome. The flying time from Paris to Canton was 80½ hr., and the elapsed time twenty-five days.



*The Paris to Tokyo flight—The Breguet 19A2 corps observation plane and its crew—Capt. Peltier d'Oisy, pilot, and Sergt. Bernard Vesin, mechanic—who have reached Canton, China*

## British World Flight

Major Stuart Maclaren, leader of the British round the world flight, who was forced down by the second failure of his propeller reduction gear at Parlu, in the Sindh desert, on April 26, resumed his flight on May 13, when he reached Nasirabad, India. On the following day Maclaren reached Allahabad, and on the 16th he arrived at Calcutta. There the Vickers Vulture is being thoroughly overhauled, and a new low compression Napier Lion engine will be installed before Maclaren resumes his flight.

The British expedition's elapsed time from Southampton, England, to Calcutta is fifty-one days.

## Lisbon to Macao Flight

Capt. Brito Paes and Lieut. Sarmento Beiros, the two Portuguese airmen now attempting a flight from Lisbon, Portugal, to Macao, a small Portuguese territory near Hongkong, China, reached Karachi, British India, on May 4. Two days were spent there to fix a leaking radiator, and on May 7 the flight was resumed in the direction of Agra, but the machine was caught in a cyclone and had to make a hurried landing at Jodhpur. The machine was seriously damaged, for it is reported that a new plane will be shipped to India to enable the Portuguese fliers to complete their flight. Captain Paes and Mechanic Gouvea, who joined the flight at Tunis, were slightly injured, but Lieutenant Beiros was unhurt.

# A Useful Radio Address on Aviation

By LAWRENCE D. BELL

Vice-President and General Manager, The Glenn L. Martin Co.

AVIATION *has had several requests for information as to the kind of a talk that could be given from radio broadcasting stations to foster public interest in aeronautics. The following address, given by Mr. Bell from The Willard Broadcasting Station WTAM at Cleveland, Ohio, on April 24, was so interesting that it is printed below as an excellent text for others to use. At our request, Mr. Bell authorizes anyone to use this address in part or completely without mentioning his name.*

AVIATION *believes that no greater service can be rendered the cause of American Aviation than if our readers "tell the world" over the radio more about aeronautics. To do this, all that is needed is to call up the nearest broadcasting station, telling them you have a radio talk on aviation and see how pleased they will be to have you speak. This was done in New York, and The Radio Corporation of America was very glad to have such a talk made at their station WJZ.*—EDITOR

## "Air Mail and National Defense"

The late war has proven that the airplane will be the most important weapon in our future national defense. To appreciate the direct relation between Air Mail and national security, it is necessary to review the accomplishments of the present Air Mail Service, and to understand the value of commercial aviation to our military organizations.

The first regular air mail service in the United States was established by our government between New York City and Washington, D. C., on May 15, 1918. Continuously since that date we have enjoyed the more rapid delivery of our mail in various sections of the country. On Sept. 8, 1920, the Post Office Department completed the establishment of a transcontinental air mail route between New York City and San Francisco, which is now the only air mail service in operation by the government.

### *Work of the Air Mail*

Since the inauguration of the first route until Dec. 31, 1923, the Air Mail has operated daily in all kinds of weather, and has carried mail a total of over 6,000,000 mi. More than 225,000,000 letters have been delivered by this service, which has established the remarkable record of completing 92 per cent of its trips on schedule.

Each year the Air Mail efficiency is notably increased. During 1923, over 1½ million miles were flown. More than 65,000,000 letters were carried, and 96 per cent of the flights were completed on schedule.

Up until the present time the Air Mail has been merely an auxiliary to train service, transcontinental mail being taken from the trains at various points in the morning, advanced by airplane during the day, and returned to trains at night. To obtain the maximum efficiency of the Air Mail Service, airplanes must fly through the night. The Post Office Department demonstrated by a five-day test last summer that night flying is not only possible but that scheduled service can be maintained with the same regularity as the day service.

During this test mail planes left New York City and San Francisco each morning. In the evening their mail was transferred to night mail planes, at Chicago and Cheyenne respectively. During the darkness the New York mail was carried to Cheyenne and the San Francisco mail to Chicago. At daylight the mail was again transferred to other planes, which finished the trips. In this manner, mail was transported from coast to coast in each direction in 27 hr., without interruption or mishap.

### *Equipment for Night Flying*

To obtain this rapid and valuable service the installation of special ground equipment was necessary. The landing fields between Chicago and Cheyenne were effectively lighted. Aerial lighthouses were built and equipped with searchlights of 450,000,000 candlepower. Along the route emergency landing fields, properly lighted, were established every 25 mi. In addition, beacon lights that flashed twenty times per minute were installed every 3 mi. to guide the pilots over the route.

In recognition of the remarkable efficiency of the present Air Mail, and realizing the tremendous value of 30-hr. mail service between the eastern and western seacoasts, Congress has recently appropriated additional funds to make night flying between Chicago and Cheyenne a permanent part of our Daily Air Mail Service. This great advancement in the transportation of transcontinental mail will be a reality yet this summer.

### *Importance to Business World*

The Air Mail will therefore soon be rendering a new and valuable service to the public and business worlds. It will be delivering important letters across our continent in less than one-fourth the time required by any other present means of transportation. Furthermore, the revenue from this service will be more than sufficient to pay all operating expenses.

The Post Office Department will issue Air Mail stamps in denominations of 8, 16 and 24 cents. The country will be divided into three zones—eastern, central and western. Our important mail will be carried by these fast airplanes between any points in each zone for 8 cents; from one zone to another for 16 cents; and from coast to coast for 24 cents.

When one considers that frequently transcontinental mail is sent special delivery, at a cost of five times the regular postage, to gain a few hours at the most in the delivery of the letter after destination is reached, it seems only reasonable to expect that such important letters will be sent by Air Mail, at a cost of 24 cents, whereby nearly four days of transportation time can be saved.

It is to be expected that Air Mail Service will meet with such financial success that it will be rapidly expanded by the Post Office Department and commercial companies operating under government contract, serving an increasing number of cities.

### *Potential Weapon of National Defense*

As cities and communities provide additional municipal airdromes, and new airways are established, and lighted for night flying, more and more our country will receive the benefits of this modern method of mail transportation. Furthermore, the installation of these necessary ground facilities will result in more general air commerce. Passengers and much of our merchandise will be carried by airplane, in competition with existing means of transportation.

Thousands of modern aircraft, operating commercially in every part of our country will be a great potential weapon of national defense. It is admitted by the military authorities in all countries that the airplane is the most important and destructive implement of war ever developed; that a warring nation without adequate air strength is doomed to defeat; that the only effective defense against aircraft is airplanes. The airplane is the only weapon of national defense of value in time of peace. European nations have realized that commercial aviation is so important to their national security that they have fostered private operation of aircraft by assuming a part of the operation expense. As a result

of this government subsidy, hundreds of airplanes are carrying passengers and merchandise daily throughout the various European countries.

The thousands of mail and commercial airplanes which we should have for the faster transportation of mail, passengers and merchandise would not only provide airplanes that could be readily converted into war machines if emergency arose but, more important, would keep in training thousands of pilots. This great commercial operation would also provide hundreds of trained ground organizations so important to the successful operation of either commercial or military aircraft. It would provide airdromes everywhere for our military aircraft, that will be necessary to protect our cities from bombing planes in case of war. It will provide airways for the movement of our military aircraft over this big country, day or night, and perhaps most important, it will provide a healthy commercial aircraft industry which could be converted at a moments notice to the manufacture of military and naval airplanes.

The Air Mail has given us a new method of transportation, which, if given the proper support by the people, is destined to solve our problem of national defense.

# LIGHT PLANES AND GLIDERS

**Edited by Edmund T. Allen**

## A New Light Plane Report

The National Advisory Committee for Aeronautics (Navy Building, Washington, D. C.) announces the publication of a compilation of light plane data garnered largely from the English Light Plane Competition held at Lympne, England, last November. At that Meeting the greater part of the machines were the products of established aeronautical houses. In this country the greater number of our entries in the Dayton Races to be held in October this year, will very probably be the designs and products of amateur builders. In fact, at present most of the interest in light planes is among the pilot-constructors with small shops at their disposal. An enterprise such as the design of a motorcycle engined airplane presents quite a problem to the man with little formal engineering training. It is as a help to such constructors that the National Advisory Committee report is published. So many requests for information have come in to the Committee that some form of composite reply was necessary. Included in the report is a digest of all machines which flew at Lympne, arranged in the order of their performance—the most efficient machines being placed first as indicating greater refinement in design.

Line drawings, to scale, accompany the description of each machine. This will enable the amateur designer to see what arrangements of parts have been tried, and which have given the greatest success. It will give the man who is unfamiliar with any form of light plane construction a quite comprehensive view of the many types of construction that are in current use. There is also included in the report a combined set of drawings of all the machines, showing relative aspect ratios and areas at a glance. This chart is illuminating to the designer when combined with the performance figures.

Finally, to answer the many queries regarding the design of a propeller for a light plane engine, four characteristic propeller designs are added to the report. These four designs cover the general conditions met with in dealing with the light plane propeller. There are two designs for a geared propeller running at half engine speed (about 1800 r.p.m.), and two designs for direct driven propellers. These propellers will be found satisfactory for the 74 cu. in. Harley-Davidson engine or for the four cylinder Henderson or Ace engines. Two of the designs are for 15 hp., and two for 20 hp., one for each being designed for direct drive, and one for geared operation.

The propeller should not be a very difficult problem for the amateur providing he goes about it carefully. With one of these designs before him, the matter is simplified to merely following directions. And yet propeller construction has always been a bugbear to the layman. With a careful selection of wood, and a good job of glueing the laminations together, the work is half done. The matter of cutting the blade to form and the final balancing are quite good fun with a little propeller of this type.

In regard to the preliminary layout of a new machine, there appeared some interesting comments in *The Aeroplane* some weeks ago. The point was made that some unwise designers have a way of beginning a design with an idea for a hinge fitting or some other detail. They then build up the design from that point outward. The finished machine often looks as if there had been no definite idea in the designers mind before he started work. It is a design without a plan. For the amateur especially it must be emphasized that the *first* operation is the general layout. After the preliminary considerations of type, form, and general arrangement are decided, the next step is the preliminary balance. This matter is especially important in light plane design where the weight of the pilot may be as much as 33 per cent of the gross weight of the machine. During the preliminary balance, some rearrangement of the wings and pilot's seat may be necessary in order to get the center of gravity to its proper position with respect to the center of pressure of the lifting surfaces. For this purpose of general arrangement and preliminary design, the National Advisory Committee report will be found very valuable. Detail design, stress analysis, etc. will come later. There are many agencies that will now perform this service for the amateur. They, or the original designer can do nothing, however, until the first work of general layout is completed.

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## Light Seaplanes in Canada

It was reported by a Colonel of the Royal Air Force, visiting Washington from Canada that there are at present in use in Canadian Forest Patrol Service, light seaplanes using Douglas motorcycle engines. The hulls of these little ships are constructed like canoes; and they stand up very well in landing on the lakes and rivers where there is little rough water. It comes as a surprise to many Light Plane enthusiasts that seaplanes can get over the hump with engines as small as the Douglas. It must be remembered, however, that this little engine of only 750 cu. cm. displacement, peaks at 24 hp. at about 4000 r.p.m. This is quite enough to get off with a light machine, and it should give a very good climb indeed to a well designed seaplane. The cost of these machines is about one fifth that of heavy machines, and in work such as forest patrol, where the only landing places are rivers and lakes, the upkeep is reduced by about 80 per cent.

It might be very useful for our government to look seriously into the matter of light planes for use in such work as well as in training and for Reserve and National Guard equipment. After the races at Dayton this fall it will undoubtedly do so. The Dayton races will furnish an excellent show ground for new light plane designs of superior performance. Besides the general public who is eager for these little machines at attractive prices, representatives of many foreign governments will be present. The machine which performs well under all conditions, has a good climb and is generally cleaned up and simple in construction, will have no difficulty in finding a market.

# AIRPORTS AND AIRWAYS

## Chicago News

By R. W. Schroeder

The Heath Airplane Co. has taken over Nimmo Black's airport for the summer, and is putting in a number of improvements. Part of the ditch along the northern end of the field has been filled in, and a bridge has been built over the big ditch back of the hangar, so ships can now taxi over these obstructions to the very far corner of the field near Lincoln Ave. These improvements give the company an L shaped field with longer runways than before, and enable planes to clear the flat buildings at the end of the field. A fence has also been put up to keep back the crowds and parking space has been provided for motor cars. A night watchman will be at the fie'd all the time.

As the Nimmo Black airport was some time ago bought by a real estate firm which staked off the field into lots, it was feared that it would no longer be available for flying purposes. These fears appear to have been unfounded, at any rate for this flying season, for road and sewers will not be put through the field until late in the summer.

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The Heath company has reduced its flying rate from $10 to $3 for joyrides over the field, except on Saturdays and Sundays when the rate will be $5 and up. As a result of this reduction there has been a very material increase in paying passengers and on a recent weekend four or five ships were kept busy all the time and everybody made money.

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Herbert Anderson has set up his Jennie, and Gus Palmquist has brought his ship over from Checkerboard Field. John Miller flew down from the Great Lakes. LaPierre Cavender has brought out his newly overhauled Laird.

The Heath "Favorite" has made its first trip with the OX5 motor equipped with the special valve gear. The ship climbed almost vertically, the motor revving up to 1650 r.p.m. with the roar of a Hisso.

The Heath Standard last week made an advertising trip to Lowell, Ind.

The La Parle brothers, formerly operating the Edgewater Beach Air Service, have gone into the motor supply business on the corner of Broadway and Briar Place. Ed La Parle flew last week over the northern side of Chicago and dropped circulars announcing the opening of his new store and inviting prospective customers to come in and get a ticket for a free airplane flight, which will be raffled off soon.

* * *

The Illinois Model Aero Club's first outdoor contest, scheduled for April 27, was postponed on account of bad weather and was held on Saturday, May 5, at the Ashburn flying field. The contest was a 50 yd. affair, with three prizes consisting of model airplane rubber.

Paul Shiffler Smith won the first prize with 2⅕ sec.; Bruce Adams, jr., second prize with 2 4/5 sec.; and Joseph J. Lucas, third prize with 4 sec. The model of Mr. Smith averaged about 46.5 mi./hr.

The new schedule of the I.M.A.C. model meets for club members is so laid out that it will help prepare them for the Mulvihill Contest in Dayton. The schedule is as follows:

May 18—100 yd. speed contest; June 8, duration contest for all types; June 22, duration contest for all types; July 13, duration contest for single propeller tractors and pushers; July 27, duration contest for twin pushers; Aug. 3, duration contest for all types; Aug. 17, duration contest for all types; and elimination contests for Mulvihill race; Sept. 7, duration contest for all types; Sept. 21, duration contest for all types and final elimination contest for Mulvihill race.

Information regarding the building of model airplanes, schedule of model meets, club work, etc., or anything that may be of help to model aviation, please communicate with Eugene Docherty, president of the I.M.A.C., 3708 Emeral Ave., Chicago.

## Moline (Ill.) News

By Harry B. Copeman

All indications point to a very successful season for commercial aviation around the tri-cities. The people are very enthusiastic and are patronizing the field in a whole hearted manner.

Lieut. E. K. ("Rusty") Campbell, Iowa's veteran aviator, is in charge of the field activities for the Moline Aviation and Motor Co., and R. T. Quinby who has been associated with Campbell for the past eight years is chief mechanic in charge of motors and planes. C. O. Pierce airscape photographer of Waterloo, Iowa, is in charge of the photo department.

The field is located 2 mi. south of town adjoining a paved road and consists of 83 acres, approaches all open. The markings consist of a circle in the center of the field and also one on the roof of the largest hangar. All field facilities are available and cross country pilots are always welcome.

Dr. C. C. Sloan, a physician of Moline, is an ardent aviation enthusiast and Campbell states that the manner in which he handles his Laird Swallow would be a credit to a veteran.

G. D. Sheppers, a business man of Moline, is also a very capable pilot and flying conditions are indeed bad if he does not at least make one trip a day in his Jenny.

Floyd Ketner of Moline has been busy this spring installing an 8 cylinder Renault in a new Standard. He has a very neat installation and should have a wonderful performing job. He is also erecting a new hangar at the field to house his ship.

## Dayton News

Capt. E. E. Adler, supply officer of the Army Round the World Flight, has returned from Walter Reed hospital, Washington, D. C., where he has been taking treatment for several months. He will go on leave from Wilbur Wright Field shortly and be transferred to another post on his return.

Captain Adler was succeeded as chief of the Compilation Section, now the Field Service Section, by Maj. Robert Brett.

South Field, the stamping grounds of Howard Rinehart and Benny Whelan's commercial activities, will be looking desolate within a few days. Workmen have started wrecking five of the six hangars to obtain material for the erection of a gymnasium for Moraine Park school. It was from this field that one of the first radio controlled flying machines ever left the ground, according to war-time stories.

The tail surfaces of a DH4B plane at McCook Field were recently lead coated by means of a metal spray in order that the fabric may be protected from the attacks of the acid formed from the condensation of chemicals used in producing smoke screens. This airplane, which is to be used by the Chemical Warfare Division in its experimental work, was flown to Aberdeen Proving Grounds, Md., by Lieut. H. R. Harris.

## Tests of Large French Aircraft

Some large aircraft were recently tested in France. One of these is a new Farman four-engined bomber which is equipped with four 500 hp. engines and carries 3 tons of bombs with a crew of five men. The machine weighs about 13 tons and measures 120 ft. in span. This ship was flight tested by Bossoutrot, the Farman test pilot.

The other plane is a Latham flying boat with a multi-engined power plant of 1500 hp. This has only been statically tested so far, the test giving a safety factor of 6.

## Fokker Planes to be Built in U. S.

Aircraft designed by Anthony H. F. Fokker, the Dutch constructor, are to be built in America, Maj. Lorillard Spencer, one of the directors of the newly formed Atlantic Aircraft Corp., announced on May 13 from the New York office of the firm. Mr. Fokker will spend a considerable part of his time in this country with the new organization.

The directors of the new corporation besides Major Spencer are: Frank R. Ford, of Ford, Bacon and Davis, Inc., engineers, 115 Broadway; Charles S. Guggenheimer, of Guggenheimer, Untermeyer, and Marshall, attorneys, 120 Broadway; Anthony H. G. Fokker, and R. B. C. Noorduyn, who has represented the Fokker interests here for three and a half years. The chief engineering charge of the factory is A. Francis Arcier, who was formerly assistant engineer with Handley-Page of England and in charge of the construction of the giant four engined bombers, built at Belfast, Ireland, during the war. Capt. Halbert E. Payne is the Washington representative.

The Atlantic Aircraft Corp. has a lease with option to buy on the factory and airport of the former Wittemann Aircraft Corp. at Hasbrouck Heights, N. J.

This factory was constructed shortly after the war especially for aircraft manufacture. The main building is of brick and has a central bay built as a single span of 107 ft. and 200 ft. long, with large folding hangar doors which open to the flying field. Adjoining this assembly floor, separated by interior walls, are the wood working and metal working shops, stock and dope rooms. The power house is located in a separate brick structure. General offices, drafting room and inspectors' offices are located on the second floor. The fact that the Barling Bomber, world's largest airplane, was constructed and completely assembled in this plant while at the same time some forty DH4's were being reconstructed on the floor will give some indication of its manufacturing facilities.

## Our Flying Cabinet Member

Secretary of Labor James J. Davis seems to be the flying member of the Coolidge Cabinet. Whenever he is in one place and it appears impossible to get to his next engagement on time, due to distance, he frequently appears there on schedule by airplane.

Recently he was able to keep an appointment at Philadelphia where he was to speak, although he was in Chicago the night before. Taking a train to Cleveland that night, he arrived at Cleveland the next morning in time to leave there with the Air Mail at 9:20 a. m. and arrived at Bellefonte, Pa., shortly before noon.

When Lloyd George was here, Secretary Davis was in San Francisco, where he had addressed the American Legion Convention. He was puzzled as to how he could reach Chicago in time to welcome his old friend, the former Premier of England. But through the aid of Secretary New, a trip on a postal mail plane was arranged, and the flying Secretary arrived in Chicago and met Lloyd George.

## Red Oak (Iowa) Activities

The Red Oak Flying Field at Red Oak, Iowa, has again been opened this season after two years of inaction and has resumed operations in student training, cross country and exhibition work. It has a fine hangar and is situated just north of the town of Red Oak. The field is level pasture and is about 2000 ft. x 1000 ft. with no serious obstructions to landing such as wires, trees or buildings. The hangar and equipment is owned by C. E. Tuttle, a local man, and is managed by C. P. Oleson. Mr. Tuttle will probably be remembered as the sponsor of one of Iowa's best Flying Meets, held at Red Oak in June of 1922, and has done a great deal for aviation in the state.

Service of any kind can be had at the field at any time and visitors are welcome.

## Selling Aviation to the Public

Marvin A. Northrop, who maintains an aero sales agency in the Builders Exchange, Minneapolis, and warehouse and flying field at Robbinsdale, in a recent letter to AVIATION makes the following vigorous comment on "selling" aviation to the public:

"Am very much interested in the Publishers' News Letter because I am sure only good and a better understanding of the other fellow's problems can come of such an agency and you will agree the result of it all will be a united attack on the problems of today.

"I believe that today the problem for the small operator of flying fields, single planes or sales agencies is to make himself a part of his community, a credit to that community, forget selling people on the "brave aviator noise," and take advantage of the curiosity *every* human being has regarding a ride in an airplane. Then through short, safe, uneventful rides in his plane, he will sell confidence to the public and open new ways for service. This, I am sure, is the keystone of the whole situation."

## H. A. Bruno & Associates

H. A. Bruno & Associates have moved to larger quarters in the Brokaw Building, 1457 Broadway, New York. This firm represents the Fairchild Aerial Camera Corporation of New York, the Fairchild Aerial Survey Co., Ltd., of Canada, the Sky-writing Corporation of America, the Atlantic Aircraft Corporation of New York and the Netherlands Aircraft Manufacturing Co. (Fokker) of Amsterdam, Holland and New York, and is the first commercial organization of its kind in the aeronautic industry for the dissemination of information pertaining to its clients.

Richard C. Blythe, treasurer of the firm, recently announced the opening of a branch office at 511 Discount Building, Cleveland, Ohio.

## Hamilton Maxwell, Inc.

Hamilton Maxwell, Inc., Aeronautical Surveyors and Photographers of 6 E. 39th St., New York, have severed connections with Underwood & Underwood, and will in the future carry on as a separate organization as they originally did.

The company has affiliated itself with Rudolph Welcker, C.E., of Springfield, Mass., who has made a study of this class of work for several years and who will in the future deal with all Maxwell sales and contracts insofar as maps are concerned, as well as acting in a consulting capacity for the firm. Arrangements have also been made with Aerial Surveys, Inc., of Washington, D. C., to lay down and complete all mapping work from photographs made by Maxwell, which firm will specialize in photographic flying service.

## Night Advertising News

The Night Aero Advertising Corp., of 552 Seventh Avenue, New York, have concluded licensing contracts under their patents for the operation of night sky advertising in several of the larger states. The company announces that they have open additional desirable territory which may be licensed by responsible parties on a fair royalty basis.

Citizens of Paterson, N. J., recently witnessed a demonstration of night sky advertising when a plane of the company piloted by Daniel Cline of Caldwell, N. J., made several flights over the city in connection with a national music week celebration. The services of plane and pilot were contributed by the company for the music week advertising.

## German Aircraft in South America

Two German airplane pilots, Capts. Erhard Milch and Christian Doxrud, have arrived in Buenos Aires with the plan to study the possibilities of establishing commercial aviation lines in Argentina, a report from Trade Commissioner George Brady at Buenos Aires, states. These pilots brought with them a Junkers 185 hp. B.M.W. plane, with a carrying capacity of six passengers, and a pilot. They plan to visit the principal cities in Argentina having aero clubs. Captain Milch is a director of the Junkers factory, and in an interview with a representative of the local press, he stated that the Junkers factory would overcome the regulations of the Versailles Treaty by manufacturing their planes in either Holland or Switzerland.

## Loening Corporation Increases Capital

The stockholders of the Loening Aeronautical Engineering Corp. at a meeting held on May 5, authorized an increase in the capital stock of the Corporation from $50,000. to $250,000.

## Fonck on a Future Air War

Capt. René Fonck, Deputy in the French Parliament and World War ace, in an article written for the *Revue des Deux Mondes*, draws a vivid picture of the danger of a German war of revenge fought in the air, and pleads for an air alliance between France and Britain against the Reich. Since the Armistice Fonck has been a leader in building up public sentiment in France for a strong air force. He is president of the French Aeronautical League, which numbers about 120,000 members.

The basis of Fonck's argument is that Germany can build within her borders, and is building thousands of "commercial" airplanes, which can be quickly transformed for military use, and by means of factories outside of Germany—in Holland, Spain, Sweden and Russia—she can build technical military planes. With her enormous chemical machine, Fonck thinks Germany could almost overnight supply gas and explosives for a potential air fleet.

"Instantaneous mobilization of these airplanes and the chemical factories will bring an immediate appearance in the air of the most terrible scourge humanity ever suffered," he says. "When the wing of a giant German airplane has whistled by, upon the face of the earth will lie thousands upon thousands of dead men, women and children. That will be the war of tomorrow. The Germans are preparing for this aero-chemical war by the realization in peace time of air hegemony. The State spirit of Germans and their abilities constitute for France an eternal menace."

Quoting numerous German authors who write that Germany will find revenge in the air, Fonck reviews the enormous number of German firms manufacturing airplanes, both in Germany and abroad. In time of need he thinks Germany could receive from foreign firms countless parts manufactured beforehand and kept in storage. All factories and all machines which made airplanes during the war still exist in Germany, he writes, and, while used largely for other purposes, they have not been basically altered.

In the all-metal plane which the Germans have constructed Fonck sees a possibility of great mass production.

Fonck expresses strong personal conviction that Germany now is laying bases for future air mobilization, and cites Germany's recent order for 1,500 airplanes from a Swedish-German firm.

"All these facts show that Germany already possesses, and certainly will soon possess, the elements of a formidable air power," he says. "Her great concerns are building air armaments, as her industrials were the makers of Berthas. When our enemies across the Rhine escape from the restrictive clauses of the Treaty of Versailles they will be capable of mobilizing a formidable air fleet, and what we know of their mentality makes us fear that they will use this modern arm suddenly some dark night, without a warning declaration of war."

## Danish Airways

After negotiations with the air transport companies of Germany and Holland and the Danish Government, the Danish Air Traffic Co. has now definitely made its arrangements for an extension of its traffic during 1924, according to a report to the Department of Commerce from the Commercial Attaché at Copenhagen.

Besides the route Copenhagen-Hamburg, which proved such a success last summer, the company will open a route Copenhagen-Hamburg-Rotterdam, connecting with the Rotterdam-London route. According to the new schedule the plane for Rotterdam will leave during the forenoon and the plane for Hamburg will leave during the afternoon. If the negotiations now carried on with interested Swedish authorities are brought to fruition, the Danish planes will fly to Malmo where they will connect with the express trains which arrive early in the morning from Christiania and Stockholm.

The Machines to be used are of the same type as employed by the allied German and Dutch companies, that is, Fokker machines with closed cabins accommodating five passengers besides pilot, mail and baggage.

A subsidy of 170,000 Kr. has been granted to the Danish air traffic company by the Danish Government who will get the profits from the air traffic as compensation.

## England for Air Force Limitation

The British Government would welcome proposals for an agreement to regulate air armaments, said Premier MacDonald recently in the House of Commons.

The Prime Minister welcomed the suggestion made by Maj. Gen. J. E. B. Seely that the time was opportune for steps to be taken to end the "mad race" of aerial armaments, and said that in the back of his mind was the intention, as soon as some of the pressing difficulties of Europe were cleared away, to face quite seriously the question of armaments of all forms.

He added that if he felt there was the least chance of receiving a welcome, he would make approaches such as those suggested.

(c) Kadel & Herbert

*Tablet placed on Old North Church, in Boston, to commemorate John Childs, a hitherto unknown flight pioneer*

It was of the greatest importance, he said, that there should be no reason for misunderstanding between France and Great Britain; but other powers were taking part in the unfortunate race which had already begun, and he felt that a sort of Washington agreement would be better than a bilateral agreement—a multilateral agreement, in fact.

## Malmo-Hmburg Air Line

The Aerotransport Aktiebolaget has announced that it will open up a service between Malmo, Sweden, and Hamburg, Germany, on May 1, 1924, for the carrying of mail and passengers. The machines to be used for this service will be DH50 passenger carriers. It is planned to operate the service in close connection with an English company which conducts an air line between Hamburg and Amsterdam and Amsterdam and London.

The Swedish company, at the time of its inauguration, will endeavor to maintain a regular service alternating with the English company in the operation of the Malmo-Hamburg route until such time as their equipment will permit them to take over the entire service on this line.

## Death of a Famous German Pilot

Otto Linnekogel, one of Germany's pioneer pilots, who established a world's altitude record of 22,276 ft. in 1914, recently broke his neck after jumping out of an airplane in which he was taking a refresher course. He had not flown for six years, and decided to take out a new pilot's license. He was extremely uneasy when he climbed on board the plane. As the machine left the ground, spectators were horrified to see him rise from his seat and jump over board while the ship was about 100 ft. above the ground. It is believed that Linnekogel was a victim of nervous collapse.

## Russia's Interest in Aerial Photography

Among three Russian scientists, who are doing research work in the laboratories of the University of Montreal under agreement between the Soviet and the Dominion governments is Prof. I. X. Dakhoff, who is specializing in aerial photographic survey work.

# UNITED STATES AIR FORCES

## U. S. ARMY AIR SERVICE

### N. Y. National Guard Air Service

The 27th Division Air Service, New York National Guard, have been doing some flying at Miller Field, New Dorp, New York, all winter, but with the opening of real spring weather, flying activities have greatly increased.

Since the first of the year a recruiting drive has been going on and the organizations which make up the divisional air service, namely, the 102nd Observation Squadron, 102nd Photo Section and the 162nd Branch Intelligence Section, are rapidly being brought up to full peace time strength. During the recruiting campaign interest was aroused by dropping hand bills from the planes, mainly over Staten Island and Brooklyn, and the machine shop truck was driven around the various centers and used by the recruiting party as recruiting headquarters.

In the future, it is hoped that radio broadcasting can be used as an added feature for getting new men. The Radio Ship, which was recently put into commission, has been up over Brooklyn, Manhattan and parts of New Jersey, and a number of letters were received from Radio fans who tuned in on the tests. They apparently enjoyed the experience of listening in and at the same time watching the maneuvers of the planes overhead, and there were several requests that broadcasting be made a regular feature, with a definite program.

Sergeant Davis who was handling the Radio during the tests, was speaking extemporaneously; in the future he plans to entertain with selections from grand opera and bedtime stories. When using the Radio ship for recruiting drives, it is planned to install a receiving set on one of the trucks which will carry a recruiting crew and stop at various busy sections of the city. Speeches broadcasted from the plane can then be received on the loud speaker and are depended upon to attract considerable attention.

Miller Field was recently visited by six ships from the 29th Division Air Service, Maryland National Guard, located at Baltimore. The Oriole outfit gave a good exhibition of formation work when arriving and taking off. The 27th are always glad to receive any of the other National Guard outfits and they expect to return the visit of the Maryland Squadron in the near future.

The annual armory inspection was held on March 20, Maj. Davenport Johnson being the regular inspecting officer with Colonel McLeer representing Division Headquarters. Due to the efforts of Capt. G. L. Usher, the regular army instructor and a small corp of fulltime enlisted men, everything was shipshape and put up a creditable showing.

An Aerial Circus is now being planned for June 28. This will be held at the Squadron Airdrome, Miller Field. Invitations have been sent out to all of the National Guard Squadrons and Government Fields in the East, and responses have been received from several, indicating full cooperation will be had. Among those who have indicated that they would be glad to take part are Mitchel Field, Langley Field, Aberdeen Field, Bolling Field, and the Maryland, Connecticut and Massachusetts National Guard Air Services. It is hoped that in addition to the above a small squadron of scout planes can be secured from Selfridge Field. Also, weather permitting, it is probable that the Shenandoah will at least fly over the field from its base at Lakehurst. Several offers have been received of cups to be put up for competition during the circus. Among the events planned are the following: exhibition stunt flying, speed races, parachute jumping, bomb dropping, combat work, and balloon shooting with machine guns.

It is assured that full cooperation will be secured from the local Chamber of Commerce, from newspapers and societies interested in aeronautics. Committees have been appointed to take charge of the preparations and a full program will be available for publication within the next week or two.

### Japanese Officers Visit Kelly Field

Kelly Field, Tex., recently entertained three officers of the Japanese Army, Lieut. Col. Matsuda, Maj. Tadashi Naka Ni Shi and Capt. E. Sugawara. This entertainment consisted of a demonstration of the horizontal attack using 50 lb. demolition bombs, three diving attacks demonstrating the combined use of synchronized guns and bombs, an attack with flexible machine guns, and an examination and explanation of the functioning of DH4B planes, their various controls and equipment.

The 8th, 26th and 90th Attack Squadrons combined furnished five airplane formations for a total of fifteen planes for this demonstration.

The visitors donned flying togs, and Captain Sugawara, piloted by Major Brereton, Major Naka Ni Shi by Captain Harvey and Lieut. Colonel Matsuda by Lieutenant Gaffney, observed at close range the effects of 1800 lb. of high explosives when dropped from an altitude of 500 ft. At the conclusion of the attack, the Group demonstrated maneuverability by flying in various combat formations while low over the airdrome.

The visitors observed the diving attack demonstration from a vantage point on a hangar roof. Four attacks were made on targets situated in the center of the Group airdrome. The first three attacks were made by sucessive flights consisting of three planes, the flight diving in column, firing forward guns and then dropping their bombs, at the conclusion of which the flight rejoined the remainder of the Group which was acting as protection against enemy aircraft. One attack was then made by the Group, in column, upon the same targets, using flexible machine guns.

These officers appeared very much interested in all phases of the inspection and all equipment which they were privileged to inspect. Colonel Matsuda stated that there was a vast difference between flight conditions here at Kelly Field and those experienced in Japan, and that landing facilities in Texas contrasted very greatly with those afforded in Japan. Major Naka Ni Shi stated that in his experience in flying over Japan he oftentimes was forced to land in rice paddies and found himself upside down in the mud.

### Corps Area Commander Inspects Attack Group

Major General Lewis, commanding the 8th Corps Area, accompanied by several members of his staff, recently conducted a tactical inspection of the Third Attack Group at Kelly Field, Tex.

The exercises undertaken were diving attacks, using synchronized guns and 25 lb. practice bombs, on targets situated on the airdrome, horizontal attacks using 50 lb. demolition bombs, and various combat formations over the airdrome. The horizontal bomb attack was particularly successful, all bombs striking within a radius of 50 yd. from the target, which was demolished.

The inspection was conducted without a hitch and was apparently a success, the pilots and observers being specially commended by the Corps Area Commander for their excellent showing.

### Daily Reports Forwarded by Airplane

An innovation in the messenger system was developed at Camp Nichols, Rizal, P. I. Every morning a plane is scheduled to fly over the Air Office at Manila and drop a message bag containing daily reports. This duty requires excellent control by the pilot and nicety of aim by the observer.

# U. S. NAVAL AVIATION

## Admiral Coontz's Report

Following are the passages in Admiral Coontz's report on the material condition of the U. S. Fleet which refer to aviation:

"*Flagships*—The Shawmut, flagship of Commander, Mine Squadron One, did not take part in Problem IV having been withdrawn to escort Atlantic Air Squadrons through the West Indies at a time when Commander Mine Squadron should have been exercising his legitimate functions with the Fleet. If sufficient suitable aircraft tenders cannot be found and maintained, the requirements of the air force should be otherwise met, or modified, as to time so as not to interfere with operations of other forces.

"*Aircraft*—In Problem IV Langley represented a modern plane carrier although actually she had only six planes which she used to good purpose considering their numbers and capabilities, and Langley's own characteristics. The Atlantic Air Squadrons had 27 seaplanes with the Black forces in Problem IV. The seaplanes were useful working from a base. An attempt should be made to operate seaplanes from a carrier. It was demonstrated that a modern Fleet must have its aircraft, fighters, at least, if nothing further can be developed. No other ships than the Langley sent up any planes.

"The catapults do not seem to be working well and aviators can not be expected in peace time operations to sacrifice themselves so readily as the theory of scouting has led some to suppose. The actual distance land planes should go from succor is 10 mi. at present, else they may sink before help arrives after a forced landing in the water. Until it has been demonstrated that planes will operate at sea from the battleships and cruisers where they are now carried it would seem premature to alter or rearrange any other types of combatant ships for their accommodation.

"The Air Squadrons Pacific did not take part in the Problems II and IV except potentially, the planes being boxed for transportation. VF Squadron One was absent at North Island; VF Squadron Two, composed of obsolete planes, was present. VO Squadrons One and Two carried no ordnance equipment because equipped with radio. These planes are obsolete and much worn in service. VT Squadron One did not carry machine guns nor radio equipment. No torpedoes nor bombs were available. It is doubtful if these planes could have lifted a torpedo off Colon. They are not fitted for bombing. These planes can not land or take off in a moderate sea, and are hence ineffective. Under the upkeep conditions obtaining probably not over half the planes in the problem could be operated at any one time.

"Generally speaking the Commander in Chief recommends concentration of attention and available funds on a very few types of planes useful to the Fleet, and their equipment. The quantity and effectiveness of the air force actually available to the Fleet did not appear favorable from a material point of view.

"*Aircraft Carriers*—Langley was useful in spite of her small number of planes and her crudeness. Her slow speed made it necessary in Problem IV to place her in the convoy instead of in the van with the Scouting Fleet, where she certainly belonged upon approach to the base which was to be seized. Her use was limited because planes can not get on or off either end, and because she had to head into the wind, thus losing position and enhancing her liability to attack. Speed and good maneuvering qualities are essential. Arresting gear, deck lighting, and other material requirements to permit night flying should be developed. Aircraft carriers should be fitted with separate radio receiving rooms to permit duplex operation in order that planes in the air may be communicated with efficiently while radio work with other units is going on.

"The construction of the new carriers should be expedited. In connection with their commissioning it should be borne in mind that each will require the constant attendance of from three to six destroyers, which should be provided for this purpose.

"*Aircraft Tenders*—Aroostook accompanied the Fleet; lost touch enroute to Culebra on account of remaining with Procyon and rejoined before arrival. Planes from Aroostook took part in Problem III, basing at Coco Solo. Planes from Wright operated from Culebra as a base in Problem IV."

Toward the end of his report Admiral Coontz, speaking of the types of ships which failed to arrive at Culebra with the Fleet, includes therein seaplanes and lighter-than-air craft. He states that the need of completing aircraft carriers and building heavier-than-air craft for use with the Fleet is demonstrated, and that measures should be taken to improve catapults in battleships and cruisers and to complete anti-aircraft batterics.

## Mooring Mast for Tacoma, Wash.

Authority for the erection of a portable mooring mast for the Navy's rigid airship Shenandoah at Camp Lewis, near Tacoma, Wash., was recently granted by Secretary of the Navy Wilbur. This mooring mast will serve as a West Coast base for the operations of the Shenandoah with the Fleet, and will also be a western terminal for trans-continental flights that may be made by that airship or by the airship ZR3, now being built in Germany for this country. The erection of this mast will be commenced by the Navy Department in the near future.

The value of a mooring mast in connection with the operations of rigid airships has been amply demonstrated by the use that the Shenandoah has made of the permanent mast at the Naval Air Station at Lakehurst, N. J., the home port of that airship. In using the mooring mast the bow of the airship is moored to a movable anchorage on the top of the mast, so that the airship can swing with the wind, similar to the movements of a weather vane.

The greatest significance of the mooring mast to the commercial use of rigid airships is that it eliminates the necessity for large and expensive hangars at each terminal of an airship route. Fuel, supplies, and men can be taken on board an airship moored to a mast, through a trap door near the bow of the airship that opens out upon a platform near the top of the mast.

## French Naval Officers Visit Camp Nichols

Eight French Naval officers from the Cruiser Jules Ferry recently paid a visit to Camp Nichols, Rizal, P. I., and spent the forenoon there taking several flights around the post. In return for this courtesy the Naval officers invited the officers of the post and their families to tea on board the French cruiser.

## CALENDAR OF AERONAUTICAL EVENTS

| | |
|---|---|
| *March 25.* | Start of the British World Flight, Southampton, England. |
| *April 6.* | Start of World Flight of the U. S. Army Air Service, Seattle. |
| *June 3-11.* | International Aircraft Expositon, Prague, Czechoslovakia. |
| *June 15.* | Gordon Bennett International Balloon Race, Brussels, Belgium. |
| *June 21.* | Annual F.A.I. Conference, Paris, France. |
| *June 22.* | Commodore Beaumont International Cup Race for high speed airplanes, Istres, France. |
| *July 5-6.* | Zenith International Airplane Efficiency Race, Paris, France. |
| *August.* | "Tour de France des Avionnettes." International Round-France race for light airplanes. |
| *Oct. 2-4.* | International Air Races, incl. Pulitzer Trophy Race, Dayton, Ohio. |
| *Oct. 24-25.* | Schneider Cup Race, Baltimore. |
| *Dec. 17.* | Twenty-first anniversary of the first successful airplane flight. |

## Naval Air Orders

Lieut. (jg) Russell H. Sullivan (SC), det. Navl. Air Sta., Pensacola, Fla.; to Aircraft Squads., Battle flt.

Lieut. Charles H. Liqued (CC), det. Massachusetts Institute Tech., Cambridge, Mass.; to Bu. Aero, Navy Dept.

Lieut. Michael C. Faber (CC), det. Massachusetts Institute Tech., Cambridge, Mass.; to Nav. Air Sta., N.O.B., Hampton Rds., Va.

Boat. Claude Tucker, det. Nav. Air Sta., N.O.B. Hampton Rds., Va.; to Aircraft Squads., Scouting Flt.

Lieut. Raymond V. Miller (CEC), Det. Vet. hosp., Tupper Lake, N. Y.; to Naval Air Station, Lakehurst, N. J.

Comdr. Robert A. Burg, Det. Bu. Aero., Navy Dept.; to member Bd. Inspection and Survey, Nav. Oper.

Comdr. Warren G. Child, Det. Gen. Insptr. Nav. Aircraft Eastern Dist., Garden City, L. I., N. Y.; to U.S.S. Langley.

Lt. Comdr. Lewis Hancock, det. Nav. Air Sta., Lakehurst, N. J.; to U.S.S. Shenandoah.

Lieut. Malcolm W. Callahan, det. Nav. Academy, Annapolis, Md.; to U.S.S. Henderson.

Lieut. Arthur R. Houghton, det. Nav. Air Sta., Lakehurst, N. J., to U.S.S. Shenandoah.

Lieut. Roman J. Miller, det. U.S.S. Shenenadoah; to Nav. Air Sta., Lakehurst, N. J.

Lieut. Francis M. Maile, det. Bu. of Aeronautics, Navy Dept.; to Aircraft Squadrons, Bat. Flt. involving flying.

Lt. (jg) Charles A. Collins, det. Nav. Air Sta. Anacostia, D. C.; to U.S.S. Raleigh involving flying.

Lieut. Raymond F. Tyler, det. U.S.S. Shenandoah; to Nav. Air Sta., Lakehurst, N. J.


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# PUBLISHER'S NEWS LETTER

Here is one of those letters that pleases a publisher more than any other form of commendation. In sending a belated payment for a subscription our friend writes: "The writer is one of those ex-Air Service men who went back on the farm nearly bankrupt. Times have been hard, but twice a day I've had a little time which has the same effect on me as a shot of good gas in the priming cups of a cold motor. That tonic is the hum of a Liberty in the mail plane that passes over my farm, sometimes as low as 300 feet. To a man who is interested in aviation it is a grand and glorious sight to see those well kept ships shining in the sun or mastering the worst gales in Iowa. Farming now-a-days is not a very profitable pastime or lucrative occupation. About a year ago I turned to radio in an effort to make a few extra dollars. Yesterday I did a repair job which netted $4.00. I am sending it along to you for last year's subscription to AVIATION. And you can look for another four dollars as soon as I can spare it. You may be sure I am most thankful for AVIATION and appreciate getting the latest news every week."

That letter is a classic in showing the hold that the air has on anyone who has once been inoculated with the "flying germ."

* * * *

Last week we published a criticism of our publication of the cost of aviation figures. Two letters from men, well known for many years in aeronautical circles, are written in a different view.

One writes, "Again appreciating your special editorials and the kick you are putting in AVIATION. The trouble with all so-called trade papers in America in the past has been that they have catered to advertisers rather than assuming authority on the subject they were supposed to know about. You have been stating facts in your columns that are eventually going to lead to real action and that will give your paper the position a trade paper should hold."

Another says: "This method of 'calling a spade a spade' is a very satisfactory and constructive way of making public an intolerable situation as regards the Air Services and the industry. You deserve a great deal of commendation for meeting the situation in such an unselfish way. However unpleasant the facts, their publication is read, I am sure, with a great deal of interest by everybody concerned, and will result in closer appreciation of each others problems and furnish the basis for far better cooperation in the future."

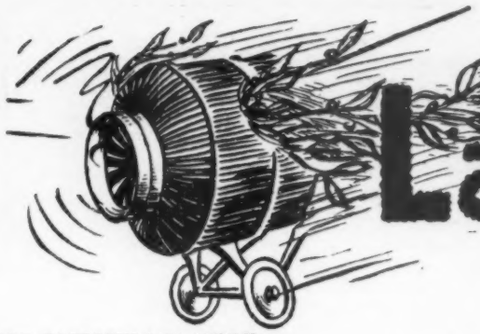
There used to be a column in a newspaper headed "Brickbats and Bouquets." If our correspondents keep on sending us such letters it may be necessary for us to make it a regular feature of the paper. In gusty weather the cautious pilot keeps his eye on his air speed indicator to prevent stalling. A publisher can only be guided by the reactions from readers as shown by their letters.

* * * *

A publisher's mail does not only contain matters that have to be used anonymously. Senator James W. Wadsworth, Chairman, Senate Committee on Military Affairs, writes as follows regarding the appointment of a special Congressional Committee to pass on aviation appropriations: "I do not see how, under our present system of making appropriations, such a committee could function. Since the creation of the Bureau of the Budget, and the modification of the rules of both the House of Representatives and the Senate by which all appropriation bills are now referred to the Committee on Appropriations, I do not see how special committees could be created and have jurisdiction over one particular subject. The creation of the Budget Bureau was the final result of efforts made in and out of Congress to bring about a practical allocation of Government expenditures, and I think it would be unwise to make an exception to the established policy in favor of one activity."

Congressman Martin B. Madden, Chairman of the House Appropriations Committee in replying to an enquiry as to the accuracy of our aviation cost figures writes: "I think what you say in respect to the 1923 expenditure figures, probably is, to an extent, correct, but how short the figure is of the total sum, counting everything, I shall not attempt to say."

Letters from Arthur Brisbane, editorial chief of the Hearst newspapers, Ralph Pulitzer, publisher of the *World*, and Louis Wiley of *The New York Times* all contain comments on aviation costs that will probably be reflected in the editorial columns of these papers.—L.D.G.



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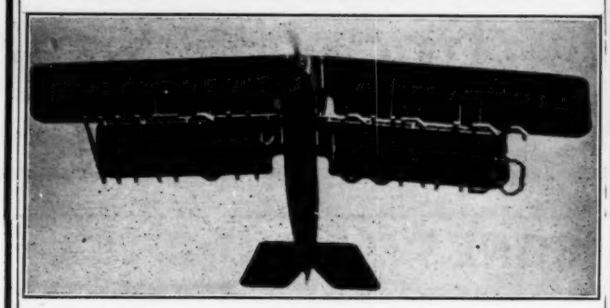

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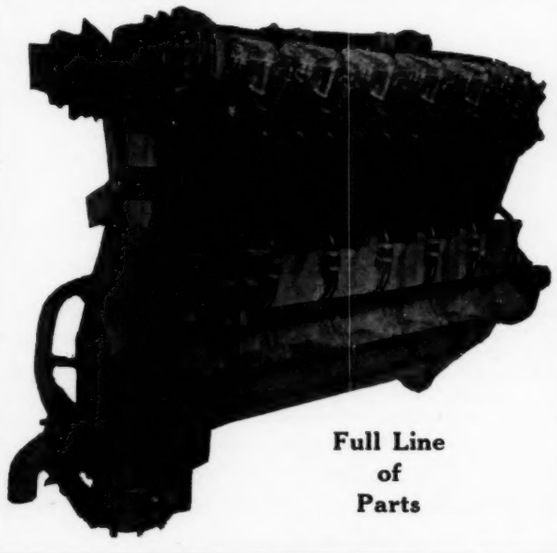

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